



[10537/126]

**REPLY UNDER 37 C.F.R. § 1.116  
EXPEDITED PROCEDURE  
GROUP ART UNIT 3748**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor(s) : Hans BRUGGEMANN et al.  
Serial No. : 09/885,626  
Filed : June 20, 2001  
For : AN EMISSION CONTROL SYSTEM AND A METHOD  
FOR OPERATING AN EMISSION CONTROL SYSTEM  
Examiner : Tu Minh Nguyen  
Art Unit : 3748

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Dated: 9/18/02

Signature: 

Richard L. Mayer (Reg. No. 22,490)

**REPLY UNDER 37 C.F.R. § 1.116**

**S I R:**

In response to the Final Office Action of June 18, 2002, kindly amend the above-captioned application as follows:

**REMARKS**

**I. Introduction**

Claims 1 to 13 are pending in the present application. In view of the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment that the drawings filed on June 20, 2001 are accepted.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all copies of the certified copies of the priority documents have been received.

**II. Rejection of Claims 1 and 9 Under 35 U.S.C. § 102(e)**

Claims 1 and 9 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,003,303 ("Peter-Hoblyn et al."). Applicants respectfully submit

that Peter-Hoblyn et al. do not anticipate the present claims for the following reasons.

Claim 1 relates to an emission control system. Claim 1 recites that the emission control system includes a particle filter and an arrangement disposed upstream from the particle filter. Claim 1 recites that the arrangement is configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

Claim 9 relates to a method for operating an emission control system, the emission control system including a particle filter and an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas. Claim 9 recites that the method includes the step of preventing development of ash-forming compounds of sulfur contained in the exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

Peter-Hoblyn et al. purport to relate to a combination of mechanical devices and fuel additives to reduce the emissions of pollutants from diesel engines. In one series of embodiments, diesel emissions of  $\text{NO}_x$  and particulates are reduced, simultaneously with gaseous hydrocarbons and carbon monoxide, by the combined use of exhaust gas recirculation or engine timing modification with a particulate trap and a platinum group metal catalyst composition. In another embodiment, a multi-metal catalyst composition comprising a combination of a platinum metal catalyst composition and at least one auxiliary catalyst metal composition, especially cerium or copper, is employed to provide catalyst metal to the exhaust system including a diesel trap to lower the balance point of the particulate trap (the temperature at which the rate of loading equals the rate of regeneration) while also lowering the emissions of carbon monoxide and unburned hydrocarbons. Peter-Hoblyn et al. further purport that various embodiments show selective maintenance of low oxidation of  $\text{SO}_2$  to  $\text{SO}_3$ .

The Final Office Action contends that "Peter-Hoblyn et al. disclose an emission control system and a method for operating such system." Final Office Action at p. 2. The Final Office Action states that "[t]he system [of Peter-Hoblyn et al.] comprises: . . . a particle filter (30); and . . . an arrangement disposed upstream

from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter (a platinum group catalyst metal composition and an auxiliary catalyst metal composition are introduced into the fuel, exhaust gas, or combustion air, which are all located upstream of the particle filter, in order to lower the balance point of the particle filter[.])." Final Office Action at pp. 2 to 3. The Final Office Action also states that "particulate matters can be combusted at the filter with minimal requirement of oxygen in the exhaust gas [and that because] of the low oxygen content in the exhaust gas, the generation of additional particulate matters from the oxidation of SO<sub>2</sub> (gaseous state) to SO<sub>3</sub> (solid state) is also reduced." Final Office Action at p. 3.

*so this*

*SO<sub>2</sub> is a gas (see p. 4 of spec.)*

It is respectfully submitted that Peter-Hoblyn et al. fail to disclose, or even suggest, an arrangement that is configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, as recited in claims 1 and 9. Specifically, the sulfur in the exhaust, which is primarily responsible for the formation of ash, is converted into compounds that do not form ash, e.g., stored sulfur released in gaseous form from a SO<sub>x</sub> trap or collector in a regeneration phase, in order to prevent ash-forming compounds of sulfur, e.g., sulfates, from forming in the exhaust. Specification at p. 3, lines 5 to 8 and lines 11 to 17. In contrast, Peter-Hoblyn et al. disclose the reduction of hydrocarbons and carbon monoxide through the combined use of exhaust gas recirculation or engine timing modification with a particulate trap and a platinum group metal catalyst composition, or through the use of a multi-metal catalyst composition comprising a combination of a platinum metal catalyst composition and at least one auxiliary catalyst metal composition in an exhaust system including a diesel trap. For instance, in one embodiment, Peter-Hoblyn et al. describe a diesel engine having an exhaust manifold 20 directing the exhaust from the engine to an exhaust system including a diesel trap 30, wherein the diesel engine is supplied with fuel from a tank 40 that has diesel fuel including a platinum group metal catalyst composition. Col. 12, lines 54 to 65. Peter-Hoblyn et al. state that "the amount of exhaust gases recirculated to chamber 26 for forming the combustion air will be effective to lower the production of NO<sub>x</sub> by the engine utilizing

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the combustion air as compared to combustion air not containing exhaust gases." Col. 13, lines 40 to 45. Thus, with respect to this embodiment, Peter-Hoblyn et al. do not disclose, or even suggest, an arrangement that transforms or maintains at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, but instead describes a process whereby exhaust gases are recirculated back to the engine. In addition, Peter-Hoblyn et al. describe another embodiment in which the injection timing of a diesel engine is set in a manner designed to reduce the nitrogen oxide emissions from the engine after combustion of the diesel fuel. Col. 13, lines 57 to 61. Specifically, Peter-Hoblyn et al. state that "the closer to top dead center (i.e., point of greatest pressure in the cylinder during the combustion process) at which the timing is set, the greater the reduction of NO<sub>x</sub> emissions achieved." Col. 13, lines 62 to 65. With respect to this embodiment, Peter-Hoblyn et al. do not disclose, or even suggest, an arrangement that transforms or maintains at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, but instead describes a process for selectively setting the injection timing of a diesel engine.

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Spec.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference: Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). That is, the prior art must describe the elements arranged as required by the claims. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). As more fully set forth above, it is respectfully submitted that Peter-Hoblyn et al. do not disclose, or even suggest, an arrangement that transforms or maintains at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, as recited in claims 1 and 9. It is therefore respectfully submitted that Peter-Hoblyn et al. do not anticipate claims 1 and 9.

Additionally, to reject a claim under 35 U.S.C. § 102, the Examiner must demonstrate that each and every claim limitation is contained in a single prior art reference. See, Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Still further, not only must each of the claim limitations be identically disclosed, an anticipatory reference must also enable

a person having ordinary skill in the art to practice the claimed invention, namely the inventions of the rejected claims, as discussed above. See, Akzo, N.V. v. U.S.I.T.C., 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986). In particular, it is respectfully submitted that, at least for the reasons discussed above, the reference relied upon would not enable a person having ordinary skill in the art to practice the inventions of the rejected claims, as discussed above. Also, to the extent that the Examiner is relying on the doctrine of inherency, the Examiner must provide a "basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics necessarily flows from the teachings of the applied art." See M.P.E.P. § 2112; emphasis in original; and see, Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). Thus, the M.P.E.P. and the case law make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic. Accordingly, the anticipation rejection as to the rejected claims must necessarily fail for the foregoing reasons.

In summary, it is respectfully submitted that Peter-Hoblyn et al. do not anticipate claims 1 and 9, and Applicants request that the rejections be withdrawn.

### **III. Rejection of Claims 1 to 13 Under 35 U.S.C. § 103(a)**

Claims 1 to 13 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication No. 2001/0035006 ("Dou et al.") in view of U.S. Patent No. 5,850,735 ("Araki et al."). It is respectfully submitted that the combination of Dou et al. and Araki et al. does not render obvious the present claims for the following reasons.

In addition to claims 1 and 9 discussed above, claims 12 and 13 are also independent claims. Claim 12 relates to a method for reducing ash components in a particle filter of an exhaust system for a diesel engine. Claim 12 recites that the method includes the steps of maintaining ash-forming exhaust components in a gaseous state in a catalyst disposed upstream from the particle filter. Claim 12 further recites that the method includes the step of storing sulfur in the catalyst. In addition, claim 12 recites the step of passing the ash-forming exhaust components in the gaseous state through the particle filter.

Claim 13 relates to a device for reducing ash components in a particle filter of an exhaust system of a diesel engine. Claim 13 recites that a catalyst is

disposed upstream from the particle filter. Claim 13 further recites that the catalyst includes a sulfur-storing catalyst configured as a  $\text{NO}_x$  collector. In addition, claim 13 recites that the catalyst is further configured to change ash-forming exhaust components to a gaseous state flowable through the particle filter.

Dou et al. purport to relate to an exhaust gas catalyst system that includes a sulfur trap warm-up catalyst, housed within the exhaust stream that includes a sulfur scavenger component and a  $\text{NO}_x$  adsorber catalyst, housed within the exhaust stream down-stream from the sulfur trap in an underfloor position. Dou et al. further purport to relate to a method of reducing sulfur poisoning of a nitrogen oxide adsorber, housed within an exhaust gas catalyst system, by placing a sulfur cap within the exhaust stream upstream from a  $\text{NO}_x$  adsorber, wherein the sulfur trap comprises a sulfur scavenger component.

Araki et al. purport to relate to a method for purifying exhaust gas of an internal combustion engine by supplying fuel to an exhaust gas passage upstream of a sulfate absorbent in order to raise the temperature of the exhaust gas flowing into the sulfate absorbent. By raising the exhaust gas temperature above a predetermined peak temperature, the ratio of  $\text{SO}_3$  in the  $\text{SO}_x$  mixture released from the sulfate absorbent is caused to decrease. The temperature is selected in such a manner that, when  $\text{SO}_x$  is released from the sulfate absorbent, the amount of  $\text{SO}_3$ , i.e., the amount of particulate matter, released into the atmosphere is relatively low.

The Final Office Action contends that "in Figure 17, Dou et al. disclose an emission control system, a method for operating such system, and a method and a device for reducing ash components in a particle filter of an exhaust system for a diesel engine." Final Office Action at p. 4. The Final Office Action contends that Dou et al. disclose certain features of the claimed invention but admits that "Dou et al. . . . fail to disclose the mechanism of sulfur adsorption and desorption in the catalyst (3), and how to minimize the production of sulfur particulate matters which can clog up the filter." Final Office Action at p. 4. However, the Final Office Action contends that "Araki et al. teach a method for purifying exhaust gas, that clearly describes in detail the mechanism of absorption and desorption of sulfur species in a  $\text{SO}_x$  absorbent (5) [whereby, in] a lean environment, sulfur compounds are absorbed by an absorbent layer of the  $\text{SO}_x$  absorbent in the form of a  $\text{SO}_4$  sulfate [, and in] a fuel rich and high temperature environment,  $\text{SO}_4$  is desorbed from the absorbent layer to become either  $\text{SO}_2$  (gas state) or  $\text{SO}_3$  (solid state)." Final Office

Action at p. 4. The Final Office Action maintains that "[d]uring the desorption of sulfur, Araki et al. selectively raise the exhaust gas to a temperature above a predetermined value and lower the oxygen content in the exhaust gas to minimize the conversion of  $\text{SO}_4$  to  $\text{SO}_3$  which is in a solid state [such that] more sulfur compounds ( $\text{SO}_2$ ) in the gaseous state are transformed from  $\text{SO}_4$  . . . and an amount of particulate matters (in the form of  $\text{SO}_3$ ) released into the atmosphere can be maintained at a low lever [sic]." Final Office Action at p. 5. The Final Office Action concludes that "[i]t would have been obvious to one having ordinary skill in the art at the time of the invention was made [sic], to have utilized the method taught by Araki et al. in the system, methods, and device of Dou et al., since the use thereof would have minimized the generation of sulfur particulate matters which can clog up the particle filter." Final Office Action at p. 5.

It is respectfully submitted that neither Dou et al. nor Araki et al. discloses, or even suggests, either separately or in combination, all of the claim limitations recited in independent claims 1, 9, 12 and 13. For instance, neither Dou et al. nor Araki et al. discloses, or even suggests, either separately or in combination, that the development of ash-forming compounds contained in an exhaust gas is prevented or reduced by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, as recited in claims 1, 9, 12 and 13. In contrast, Araki et al. seek to instead minimize the amount of  $\text{SO}_3$ , i.e., particulate matter, released from a sulfate absorbent into the atmosphere. Specifically, Araki et al. describe a method for purifying the exhaust gas of an internal combustion engine. Col. 2, lines 38 to 39. The exhaust gas of an internal combustion engine containing sulfur oxide is contacted with a sulfate absorbent at a temperature lower than a releasing temperature. Col. 2, lines 40 to 43. The temperature of the sulfate absorbent after it has absorbed sulfur oxide is then raised to a predetermined temperature higher than the releasing temperature to cause the sulfate absorbent to release the absorbed sulfur oxide. Col. 2, lines 43 to 47. The sulfate absorbent absorbs sulfur oxide in the exhaust gas when the temperature is lower than the releasing temperature and releases the absorbed sulfur oxide when the temperature becomes higher than the releasing temperature. Col. 2, lines 47 to 51. The predetermined temperature to which the sulfate absorbent is heated is selected in such a manner that the ratio of the sulfur trioxide component in the sulfur oxide mixture released

from the sulfate absorbent at this predetermined temperature is lower than the ratio of the sulfur trioxide in the sulfur oxide mixture released from the sulfate absorbent at the releasing temperature. Col. 2, lines 51 to 57. Thus, Araki et al. do not disclose, or even suggest, how to minimize the clogging of a particle filter by preventing the development of ash-forming compounds that enter the particle filter by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter. Dou et al., on the other hand, seek to prevent sulfur poisoning of an NO<sub>x</sub> adsorbent by employing a sulfur trap in a NO<sub>x</sub> adsorber system. Specifically, Dou et al. purport that an exhaust gas catalyst system may provide improved management of NO<sub>x</sub> and sulfur components through incorporation of a sulfur trap upstream from a NO<sub>x</sub> adsorber, wherein the sulfur trap includes a sulfur scavenging component, such as barium, strontium or magnesium, and optionally an oxidation catalyst and/or a lean NO<sub>x</sub> catalyst. Page 2, par. 35. Thus, there is no disclosure or suggestion by Dou et al. regarding how to minimize the clogging of a particle filter by preventing the development of ash-forming compounds that enter the particle filter by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Since the combination of Araki et al. and Dou et al. does not disclose, or even suggest, all of the limitations of claims 1, 9, 12 and 13 as more fully set forth above, it is respectfully submitted that the combination of Araki et al. and Dou et al. does not render obvious claims 1, 9, 12 and 13.

It is respectfully submitted that the cases of In re Fine, supra, and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that the Final Office Action's generalized assertions that it would have been obvious to modify or



combine the references do not properly support a § 103 rejection. It is respectfully submitted that those cases make plain that the Final Office Action reflects a subjective "obvious to try" standard, and therefore does not reflect the proper evidence to support an obviousness rejection based on the references relied upon. In particular, the Court in the case of In re Fine stated that:

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. This it has not done. . . .

**Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.**

In re Fine, 5 U.S.P.Q.2d at 1598 to 1600 (citations omitted; italics in original; emphasis added). Likewise, the Court in the case of In re Jones stated that:

Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. . . .

**Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].**

In re Jones, 21 U.S.P.Q.2d at 1943 & 1944 (citations omitted; italics in original).

That is exactly the case here since it is believed and respectfully submitted that the present Final Office Action offers no evidence whatsoever, but only conclusory hindsight, reconstruction and speculation, which these cases have indicated does not constitute evidence that will support a proper obviousness finding. Unsupported assertions are not evidence as to why a person having ordinary skill in the art would be motivated to modify or combine references to

provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, the Office must provide proper evidence of a motivation for modifying or combining the references to provide the claimed subject matter.

More recently, the Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a "technologically simple concept" -- which is not the case here -- there still must be some finding as to the "specific understanding or principle within the knowledge of a skilled artisan" that would motivate a person having no knowledge of the claimed subject matter to "make the combination in the manner claimed," stating that:

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper prima facie case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Fed. Cir. 2000) (emphasis added). Again, it is believed that there have been no such findings.

It is therefore respectfully submitted that the combination of Dou et al. and Araki et al. does not render obvious independent claims 1, 9, 12 and 13. Furthermore, it is respectfully submitted that the combination of Dou et al. and Araki et al. does not render obvious dependent claims 2 to 8, which depend from claim 1, and claims 10 and 11, which depend from claim 9. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious). Thus, it is respectfully submitted that claims 1 to 13 are allowable for these reasons, and withdrawal of the rejections is requested.

**IV. Conclusion**

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

KENYON & KENYON

Dated: 9/18/02

By: *[Signature]*

Richard L. Mayer  
Reg. No. 22,490

One Broadway  
New York, New York 10004  
(212) 425-7200

**CUSTOMER NO. 26646**



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